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AN EXAMPLE OF SUCCESSFUL FARM MANAGEMENT IN SOUTHERN NEW YORK.

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INTRODUCTION.

Most farm problems present several aspects. There must be a proper adjustment of the crops to the soil and environment and the proper balance between farm animals, food supply, and physical environment. The first two phases have received much well-merited

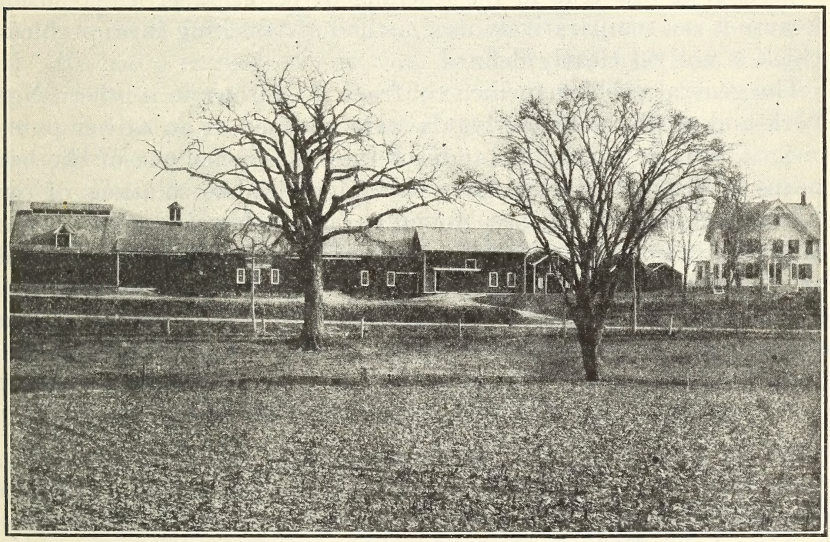

Fig. 1.—The farmstead of M. J. English, showing the clean condition of the grounds and the macadam road in front of the buildings.

attention, but the proper balance between crops and animals and the economic adjustment of both these factors to production and marketing have been left to work themselves out. It is particularly because Mr. M. J. English, of Broome County, N. Y., has so successfully solved these important problems of farm management that the example of his farming is valuable. The type of farming which

[1] Employed cooperatively by this department, the New York State College of Agriculture, the Binghamton Chamber of Commerce, and the Delaware, Lackawanna & Western Railroad at time when this was written.

he is carrying on is well illustrated by the conditions about the farmstead, as shown in figure 1.

The purpose of this bulletin is to emphasize the following facts: It is not enough to raise good crops or to secure large animal production; these must be economically secured. This is only accomplished when capital and labor are so adjusted to existing conditions that maximum yields are obtained at the lowest cost. To farm successfully every department must be well organized and must be coordinated with the others. Labor must be fully employed, capital must be well utilized, both quantity and quality of products must be secured, and the products must be well marketed. All these things come as the result of close attention to and a detailed knowledge of the business.

The reason and at the same time the justification for recounting the experiences and the methods of any individual farmer, however successful he may be, lie in the fact that a definite illustration brings out the underlying principles most clearly and effectively. To most practical men the concrete appeals more strongly than the abstract. Especially is this true in the teaching of better farm management, because it is a comparatively new method of attacking farm problems which is not yet clearly defined.

The general problems which confront the farmer in southern New York and northern Pennsylvania were outlined in an earlier publication.[1] In the continued study of these problems, one of the best means of getting information which might lead to solutions of certain phases of them has been found to be the observation of successful farms. For two years the work and methods of Mr. English have been studied. It is because he had worked out a more profitable solution of farm problems in this region than any other man in our experience that his success is worthy of telling and of reading.

HOW THE OWNER BECAME A FARMER.

Mr. English purchased the farm in 1897. He had no previous farm experience to aid him in starting the enterprise. His new possession consisted of 162 acres of land, "more or less," with good buildings and all the stock, machinery, and other equipment then on the farm. The stock consisted of 3 horses, 50 cows, 12 head of young cattle, and a few chickens. The ordinary equipment was left on the place, together with some hay, grain, and roughage. About 90 acres of the farm lie in the broad, level valley, the remainder being on a slope too steep for cultivation and on the top of a hill nearly 500 feet above the valley. About 30 acres of quite level and easily

[1] Burritt, M. C. Agricultural conditions in southern New York. U. S. Department of Agriculture, Bureau of Plant Industry, Circular 64, 19 p., 6 fig., 1910.

tillable land are on the hilltop, but it is difficult of access. For this entire property $16,000 was paid—$8,000 in cash and $8,000 as a mortgage. The land and buildings were valued at $12,000 and the stock and other movable equipment at $4,000.

The former owner had been in possession of the farm for 67 years. It had been profitable 30 or 40 years before and had been recognized as a farm of considerable fertility. In the years immediately preceding its purchase by Mr. English it had not paid expenses, to say nothing of the interest on the investment, and the neighborhood generally prophesied that the former owner would get the farm back on the mortgage in a few years. It was even said that there was a deliberate purpose in selling to one who had so little farm experience. The following pages will show how far wrong the reckoning was. The man and the progressive and businesslike spirit within him were not known to the community.

INFLUENCE OF FARM EDUCATIONAL AGENCIES.

As can readily be imagined, Mr. English found himself in a rather difficult position when he took possession of the farm. He was practically without farming experience and had very little working capital. He had a rugged constitution, however, and had been brought up on hard work, so that he was not afraid of it. To the college and the agricultural press, and especially to the personal help and interest of one college professor, he ascribes all the success he has ever made. These forces stirred him to study his business and to use in every way possible the agencies at hand which would help him and which would aid him in obtaining a better knowledge of the principles of farming. He had observed that rapid progress was being made in every line of industry but agriculture, and he took a new interest in everything pertaining to better farming. Yet he never made the mistake of taking advice wholesale. It was always weighed carefully and measured in the light of his own conditions.

BUILDING UP THE VALLEY FARM.

When Mr. English took stock of his resources he found that his income was practically confined to one source—dairying. Some cows were making a good profit; others were causing a daily loss. The fertility of the soil was maintained by the use of manure alone and this went to produce feed crops for the cattle. Very little hay was sold. There was no systematic plan of crop production or rotation or definite method of soil improvement.

Such a system has several faults, the correction of which was early recognized as essential to success. Unprofitable cows were destroying the profit from the better ones. The limitation of the income to

practically one source put upon that factor the entire burden of the farm expenses. Labor was poorly distributed and was of necessity frequently employed on unproductive enterprises in order to hold it for the dairy work, and this was unsatisfactory both to employer and men. No definite system of crop production was in use to provide the right proportion of each crop with the proper distribution of labor. The maintenance of fertility was expensive. All these things it was determined to remedy.

The first step to be taken was the improvement of the dairy. The performance of each cow was studied and the unprofitable ones disposed of. The next most important step was to increase the sources of income by growing such other crops as the labor necessary for the dairy could handle without extra expense, or, in other words, to diversify the farming. The third, but by no means the least important step, was to be the development of a rotation that would improve the soil, furnish the maximum feed for the stock, and provide a cash crop. These were at once taken up and carried out as rapidly as possible.

IMPROVING THE DAIRY.

A herd of 50 fairly good cows was purchased with the farm, and at the start dairy products were about the only source of income. Gradually this has been changed, and at present, even though the dairy is an important part of the farm, attention is given to several lines. One of the chief purposes of this paper is to depict the methods of change and to show that the readjustment and the substitution of other lines in place of part of the dairy were justifiable.

A pure-bred sire was included in the farm purchase. Several cows also were pure bred, but the certificates of registration were lost at the transfer of the property and the owner has never had them reentered.

It has been the policy at all times to keep a pure-bred sire of good quality in the herd. The heifer calves from the best producing cows were grown and tested out for dairy production, the best being kept and the others discarded. In this way the quality and producing power of the cows have been constantly increased.

The herd to-day is uniform and able to produce results. Several cows have produced 60 pounds or more of milk a day and have maintained this record for continuous periods of from four to six months. In addition to the cows which are produced on the farm it is the practice of the owner to buy a few each year. Mr. English buys cows just fresh, or those which will become fresh soon, at a nominal figure. They are fed in his dairy for production during one year. By this time they are in good condition for beef and are sold to a butcher for at least as much as their purchase price and in the

majority of cases at a considerable increase. Thus, there are two profits, the profit secured in milk production and the profit accruing from the wise buying and selling of the stock.

Gradually the herd has been changed into one for winter milk production. Several factors seemed to make this advisable: (1) It secured a more even and a better distribution of labor; (2) in this way the largest quantity of milk is produced at the season of the year when it is worth the most money, and (3) better production can be secured in the winter than at other times of the year. The hill pastures are very poor for summer milk production. They are distant from the stable and at the top of a very steep hill. In the words of the owner, the cows consume about all the energy they get from the field in going to and from it. In the winter the cows can be kept quiet, and detailed attention can be given to their needs.

RESULTS FROM THE DAIRY.

To demonstrate that the methods followed have given good results, Table I shows the quantity of milk produced by the herd of 27 cows and sold at the creamery from September 1, 1910, to August 31, 1911. During this year but 17 of the cows became fresh, the rest being carried over from a previous freshening period.

TABLE I.—*Production of milk from a herd of 27 cows on the English farm for the year ended August 31, 1911.*

Period.	Quarts of milk.	Cents per quart.	Receipts.	Period.	Quarts of milk.	Cents per quart.	Receipts.
Sept. 1 to 15	2,253	3½	$78.85	May 1 to 15	4,893	3	146.79
16 to 30	2,354	3½	82.35	16 to 31	4,449	3	133.47
Oct. 1 to 15	2,675	4	107.00	June 1 to 15	3,498	3	104.94
16 to 31	3,032	4	121.28	16 to 30	2,755	3	82.65
Nov. 1 to 15	2,607	4	104.28	July 1 to 15	2,142	2½	53.55
16 to 30	3,376	4	135.04	16 to 31	2,060	2½	51.50
Dec. 1 to 15	4,656	4	186.24	Aug. 1 to 15	2,153	3	64.59
16 to 31	5,854	4	234.16	16 to 31	2,127	3	63.81
Jan. 1 to 15	6,154	4	246.16				
16 to 31	6,854	4	274.16	Sold to two families			
Feb. 1 to 15	6,322	4	252.88	for year	1,460	4	58.40
16 to 28	5,536	4	221.44				
Mar. 1 to 15	6,232	4	249.28	Total	100,902		3,695.09
16 to 31	6,235	4	249.40				
Apr. 1 to 15	5,687	3½	199.04				
16 to 30	5,538	3½	193.83				

The average production per cow per year was 3,737 quarts, or 8,034 pounds of milk, which was sold for $136.85. In addition to the milk which has already been mentioned, the dairy supplied the home of the owner and the families of two hired men. This probably amounted to 6 quarts or more daily, but as it is impossible to be accurate the figures are not included.

The following comparison of this milk production with average conditions emphasizes its development:

According to the Twelfth Census, Broome County, N. Y., contained 31,898 dairy cows 2 years old or over and the census states that 15,868,547 gallons of milk were produced in one year. It is then evident that the average production per cow in Broome County was 497.47 gallons or 1,989 quarts annually. This number (1,989) is to be compared with 3,737, the average production of the herd of Mr. English for the year, in quarts. This latter number is obtained by dividing 100,902, the product sold from the dairy, by 27, the number of cows in the herd. This difference in production is very striking. The average annual production per cow in the English herd is 87.9 per cent greater than the average production of the cows in Broome County. Stated another way, 7 cows of Mr. English are better than 13 cows found on the average farm in the locality. At 4 cents a quart the average gross income per cow in Broome County is $79.52. At the same price the average gross income per cow in the English herd was $149.48.

The weekly grain ration on this farm during this period (September 1, 1910, to August 31, 1911) was made up as follows:

200 pounds of gluten at $25 per ton	$2.50
200 pounds of corn meal at $20.25 per ton	2.02
200 pounds of bran at $23 per ton	2.30
100 pounds of ground barley at $25 per ton	1.25
50 bushels of wet brewers' grains at 10 cents per bushel	5.00
2 sacks of malt sprouts at $1 per sack	2.00
Total cost	15.07

From December 1 until April 1, a like quantity of other grains was fed each week to the 27 cows.

The quantity of brewers' grain and sprouts varied somewhat from time to time. When sufficient brewers' grains could be secured, no malt sprouts were used. Mr. English considers malt sprouts very effective when used with the wet grains. He mixes the two materials thoroughly to make sure that the malt sprouts are well softened, thus overcoming a danger which is present when malt sprouts are fed without a previous thorough soaking. The prices in 1910 and 1911 were much lower than in 1912, and at present prices this ration could not be made up so cheaply.

In November and April and the first half of May about one-half as much grain is consumed as is used during the winter. At these times it is not necessary to buy any sprouts, as enough wet grains can be secured. From May 15 to September 1 wet grains alone are used. From September 1 to November 1 about one-fourth of the winter dry-grain ration is fed in connection with the wet brewers' grain.

As explained later in this bulletin this farm produces much excellent silage and very large quantities of clover hay, which are fed in the dairy. Better cows are bred and kept than formerly. They receive good care, and a large production of milk is the result. In these ways the dairy problem was solved.

A LESSON IN DIVERSIFICATION.

When the present owner first took the farm, clover and timothy were raised for hay and corn was put into the silo. Barley was grown and ground for the cattle and some oats were raised for the horses. A little hay was sold under this system. This method of operation is the common and often the only method in the section, except that some farmers attempt to make summer milk on the poor pastures.

Mr. English found that with this method the cows were the limiting factors in the profit. No matter how large the crop or what it was worth in the market its value was measured entirely by what the cow could make out of it. If the price of the milk was low, so was the price of the crop. If the cow was a poor one, the price of the crop was still lower. Moreover, there was much time on this farm when the labor was not fully and profitably employed. The distribution of labor was so poor that the men could not be given steady employment by the year, and some difficulty was experienced in getting satisfactory labor. So this farmer wanted to add to his income without cutting down the income from milk, and by this means to secure a better distribution of labor.

Sugar beets were first tried, as a factory was then in operation at Binghamton. It was found that an average of from 15 to 20 tons of beets could be raised per acre, which brought $5 per ton. An average income of at least $75 an acre could thus be obtained, besides saving as many tops as there were beets sold. These were of considerable value as a succulent feed for the cows. It was also the custom to return from the sugar factory with as much beet pulp as the weight of the beets delivered. This material was an excellent supplement in feeding the dairy cows, and cost little to handle.

These methods permitted the selling of more hay, so that the income, instead of being principally from milk with a little hay, was added to considerably by the sale of beets and more hay. Labor was more fully employed and better distributed throughout the season, and the additional expense was very slight in proportion to the increase in the income.

The sugar-beet factory was soon closed down, however, and in that same year a canning factory was established at Binghamton, so that the opportunity to grow sweet corn, beans, and peas for it was

at once taken. These brought in a good income and took the place of the beets in the system. This was especially true of the sweet corn, as the stalks make excellent silage. The canning factory lasted two years, after which sweet corn was shipped out of town for two years more.

The next crop tried was potatoes, and it proved to be so good a money maker that it is now an annual crop. Irish Cobbler was the variety grown, and with good culture 300 to 350 bushels per acre were produced annually. As many as 5,000 bushels of potatoes are often grown on this farm in one season.

The growing of these crops led to some direct sales in the city and until the last year or two a small but profitable direct market-garden business was carried on. Potatoes and apples are still sold direct in the city. For a number of years from one-half to 3 acres of onions have been grown, but onion thrips have now made this unprofitable.

The large cash sales from these crops as compared with grain and hay early taught Mr. English the lesson which so many farmers are now learning to their advantage, namely, that it is cheaper to buy grain than to raise it when the land upon which grain is grown will yield much more—often double—the cash value of the grain in other crops. It is a simple economic proposition to decide which is cheapest—home-grown or purchased grains. Mr. English figured that he could raise enough sweet corn, potatoes, onions, or other similar crops to buy the grain which would have grown upon his land and still have a good margin left for profit.

ROTATIONS.

At first, when hay was being sold regularly, it was considered necessary to purchase large quantities of manure. This was obtained in the city at $1 for a 2-horse load. It was used principally on the corn land, but was also put on the land used for other cultivated crops. About the fourth year it happened that a good clover sod was plowed under for corn. The result astonished Mr. English. He had read much about rotations, but it was not until this striking example was thrust upon him that the real importance of a rotation with clover was fully realized. A short rotation with clover as the basis was at once adopted and has been continuously followed. With clover in the rotation every third or fourth year, the clover fed to stock, and the manure used on the farm, no anxiety is felt about soil fertility. No manure has been purchased since 1906.

Mr. English is an ardent advocate of the use of clover, both as a forage plant and as a soil improver. It is the key to success in his system of farming. His average crop of clover is about 3 tons per acre and several times he has cut 5 tons per acre in two cuttings.

Not only does it yield practically as well as alfalfa under his conditions, but it is regarded as equally valuable as a feed for cattle. For such use he insists that the clover must be cut earlier than is the custom. He aims to cut it before much bloom appears. Despite the lower analysis of clover in digestible protein, his practical experience shows that it is as good a milk producer as alfalfa.

In addition to the grain ration mentioned, the cows on the farm receive a good feed of silage and all the clover hay they can consume.

A FEED-PRODUCING AND SOIL-UPBUILDING ROTATION.

During the development of this rotation a definite ideal was constantly kept in mind. Mr. English has always carefully investigated any promising new crop or method, and if the experience of others and a test of it in a small way warranted, he adopted it. The definite rotation finally chosen was clover for one or, possibly, two years, corn and potatoes following the clover, and then barley. This rotation was subject to such modifications as the situation demanded, such as repeating the corn or growing two crops of hay when the new seeding failed to catch.

At first hay had been cut several years in succession from the same meadow. It was very difficult to get a good stand of clover in oats on the rich bottom land, as the oats would lodge and smother out the seeding. Because of this trouble another crop in which to seed down was sought.

Hay land was heavily manured and planted to corn, which was followed by beets, a heavy application of commercial fertilizer being made with these. Beets were sometimes followed again with corn, but more often with oats. After it was found that a good stand of clover could not be obtained in oats this crop was cut green for hay, the ground replowed or disked, as the case might be, and the clover sown alone late in August or early in September. By selling timothy hay more oats could be purchased than could be raised where the timothy grew and a margin was left for profit.

After some trials Oderbrucker barley, a 6-rowed variety, was used to replace the oats, and this has been the regular grain in the rotation since 1907. Even this sometimes lodges and kills out the clover, as happened in 1910. To reduce the possibility of lodging to a minimum, the quantity of seed has been decreased from 1½ bushels to 3 pecks per acre.

Timothy is not grown unless the exigencies of the season demand it. In 1912 one of the previous year's meadows was left down and some timothy hay grown for sale, because the clover seeding had to be turned under the previous year and the price of timothy hay was unusually high ($25 a ton in 1912).

This facility of adapting his farming to the conditions of the season and the markets is one of the things which makes the farming of Mr. English so noteworthy.

In this rotation as now practiced commercial fertilizer is used on potatoes only. From 500 to 600 pounds of a fertilizer containing 4 per cent of nitrogen, 6 per cent of phosphoric acid, and 10 per cent of potash is almost always used, being applied with a potato planter. Tests have shown that fertilizers with corn were unprofitable under the conditions of this farm, but that manure gave very satisfactory results. On all the land to be seeded to clover, from 400 to 600 pounds of hydrated lime (this form is used because it is easiest to apply, though its first cost is higher than other forms) is applied once in three years. In all these applications no fixed rule is invariably followed, but the needs of the crops and the season are always considered. A definite system followed as closely as good judgment will permit is the very best kind of farm management.

SUMMARY OF THE RESULTS ON THE VALLEY FARM.

The results of 15 years' work along these lines has been the development of one of the most successful systems of farm management in the whole region.

Every cow in the dairy is now a profitable one. All the "boarders" have been dropped. Without materially increasing the expenses of the farm, the income has been practically doubled by supplemented receipts from the dairy and by cash crops for the city markets, especially potatoes.

While the income from the dairy has been increased, the expenses have been reduced by growing a larger part of the rations on the farm. Succulent feeds and feeds high in protein have made this possible, especially corn for silage and clover hay. A short rotation with clover and the judicious use of commercial fertilizer maintain the productiveness and the physical condition of the soil.

MANAGEMENT OF THE HILL LAND.

In addition to the land which is in the valley along the river and about the buildings, a part of the English farm lies about 400 feet above the main valley at an elevation of about 1,300 feet above sea level. A very steep hill separates this part of the farm from that which lies in the valley. This part of the farm is typical Volusia silt loam. It is this soil type which is most widely distributed in southern New York. It occupies the higher hills and is of such a character that poor farming methods very soon bring it to a depleted condition. This soil is largely responsible for the ill fame which has come to New York State as a section of abandoned farms and poor agriculture.

CONDITIONS OF THE HILL LAND.

The hill portion of this farm is particularly typical in accessibility and general conditions of southern New York and northern Pennsylvania. The owner of a valley farm is in a position to handle contiguous hill lands in connection with his valley farm more profitably than any one else, and the experience of Mr. English demonstrates that this type of land can be made productive and profitable.

This general type of soil needs lime, frequent and thorough cultivation, organic matter, and some plant food, largely phosphoric acid. In some cases it needs drainage, and if such is the case it is useless to handle it without drainage and expect the best results. Mr. English realized this and has given attention only to the better drained portions of the land which he owns. However, he owns some land which is poorly drained, and he expects to begin reclaiming it by installing an artificial drainage system.

IMPROVING THE FIRST FIELD.

For some time after he purchased the farm Mr. English gave but little consideration to this hill land, using it for pasture and being satisfied with what little grew of its own accord. His first attempt toward improvement was with a 6-acre field which at that time was nothing but a poor pasture, in just about the same condition that a majority of the pastures in the section are to-day. He plowed it in the spring of 1906, picking off the stones before and after plowing. During the summer the field lay fallow, but was cultivated at frequent intervals to get good tilth. In September the land was sowed to rye. A fairly good stand was secured the following spring, and it was allowed to grow until June 1, when it was plowed under. The field was left fallow but received cultivation until July 10, when buckwheat was planted. Planting the buckwheat was intentionally late, so there would be no possibility of its getting ripe and thus affording a temptation to remove it from the land. As soon as the buckwheat was full grown the cows were turned on it to feed and to tramp down the growth.

During the process of improvement Mr. English made it a point to plow a little deeper at each successive plowing, until at length he was able to plow 8 to 10 inches deep. He was careful to pick off any large stones which had been turned up, but at no time was the stone picking particularly arduous. Most of them were removed just before and after the first plowing. After that it was necessary to remove only those which the later plowings had loosened.

After the cattle had pastured off the buckwheat somewhat in the fall of 1907 and it was trampled down sufficiently, the field was plowed. In the spring the land was thoroughly prepared and planted to potatoes. An application of 600 pounds per acre of fer-

tilizer containing 4½ per cent of nitrogen, 9 per cent of phosphoric acid, and 10 per cent of potash was made. During the summer the potatoes received good cultivation and in the fall gave a yield of 800 bushels of merchantable potatoes from 6 acres.

After potato digging, the land was fall-plowed and the next spring it was planted to barley. Previous to sowing the barley 7 tons of plaster lime were applied with a manure spreader to the 6 acres. The weather was very dry and the barley, a small-growing 2-rowed variety, did not grow very well. At the time of sowing the barley an application of grass seed, consisting of a mixture of 12 quarts of red clover and 4 quarts of timothy per acre, was made. The grass came up nicely and made a fine stand. On account of dry weather the clover did not seem to be doing very well, so Mr. English mowed the barley before it was ripe and secured two small loads of barley hay. In this way the stand of clover was saved and it grew luxuriantly during the summer and fall.

The next spring the clover was allowed to grow until early in July, when the cattle were turned in to pasture it. The crop was especially good and Mr. English was severely criticized by his neighbors for his practice.

That fall, 1909, the field was again plowed, the organic matter and the nitrogen of the clover thus being added to the soil, and potatoes were planted the next season. Good cultivation and good weather conditions were factors favoring a good yield. This time 200 bushels per acre of marketable potatoes were secured. About 600 pounds of the potato fertilizer mentioned were used on this crop.

The cost and income of the second crop of potatoes were estimated by the owner and the writers to be as shown in Table II.

TABLE II.—*Cost of and income from the second crop of potatoes on 6 acres of hill land of the English farm.*

Item.	Cost.		Income.	
	6 acres.	Average per acre.	6 acres.	Average per acre.
Value of land after improvement,[1] 6 acres, $40 per acre, $240, interest at 5 per cent	$12.00	$2.00		
Plowing	16.00	2.67		
Preparation (harrowing 4 times)	10.00	1.66		
Planting	8.00	1.34		
Seed, 10 bushels per acre, at 60 cents per bushel	36.00	6.00		
Fertilizer, 600 pounds per acre, 4½-9-10	60.00	10.00		
Cultivation, 5 times	30.80	5.13		
Spraying for bugs only	2.80	.46		
Digging and picking up	40.00	6.67		
Marketing	36.00	6.00		
Total and average cost[2]	251.60	41.93		
Receipts, 1,200 bushels of potatoes, at 60 cents per bushel			$720.00	$120.00
Income (taxes and use of machinery not included)			468.40	78.07

[1] This land in its unimproved condition was valued at $20 per acre. Adding to this value the cost of improvements we find its present value to be $40 per acre.

[2] Dividing $251.60 (the total cost of production) by 1,200 (the number of bushels), the cost of production is found to be $0.209 per bushel.

In the autumn of 1910 the ground was again plowed, and in 1911 it was planted to oats. This time about 1,200 pounds of acid phosphate were applied to the 6 acres, a moderate application of lime being also made. The oats yielded 55 bushels to the acre. Mr. English did not treat his oat seed for smut. The writers went through the field a short time before the oats were ripe and found that from 20 to 30 per cent of the plants were smutted. No doubt had this not been the case the yield would have been greatly increased. The field had a fine stand of clover later in the season.

The cost of and income from this land for five years are shown in Table III, allowing 30 cents per bushel as the cost of growing the oats and estimating the cost of growing the first crop of potatoes to be the same as that of the second crop.

TABLE III.—*Cost of and income from 6 acres of hill land on the English farm for five years.*

Crop.	Yield (bushels).	Cost.[1]	Income.		
			Cents per bushel.	Gross receipts.	Net receipts.
Potatoes (first crop)	800	[2] $251.60	80	$640	
Potatoes (second crop)	1,200	251.60	60	720	
Oats	330	99.00	50	165	
Total		602.20		1,525	$922.80
Average per acre per year				50.83	30.76

[1] Details of the cost of the second crop of potatoes are shown in Table II.
[2] Cost of the first crop of potatoes estimated to be the same as that of the second crop.

An income of $30.76 per acre per year for each of the five years is not a bad record for abandoned land. This certainly would justify a valuation on this hill land of not less than $100 per acre, which would much more than pay for the improvements made. The cost of growing and turning under the green crops, the picking up of the stones, and the use of the lime was about $20 per acre. In the above figures this amount has been added to the original land investment, and interest on it has been charged at 5 per cent.

Another factor makes the profit from this improvement greater than the figures indicate. No additional cash expense was incurred for either man or horse labor, although this has been charged against the crops as cash. These improvements and the growing of the additional crops were carried on with regular farm labor, and this made a more efficient distribution. It was necessary, however, to rearrange the rotation in the valley somewhat, growing more hay and a little less of the intensive crops, such as onions and potatoes, but owing to the high price of hay this did not cut down the income greatly.

METHODS OF IMPROVEMENT USED ON THE SECOND FIELD.

On account of his success in bringing up the first field Mr. English decided to try another field. This time he concluded not to wait to prepare the land before getting any crop, but to grow regular crops and accomplish the improvement at the same time. He depended on the many crops of goldenrod and other weeds which had grown up, died, and decayed on this land to supply the humus for at least one crop.

In the fall of 1910, after picking up the stones, he plowed 11 acres of this old unproductive pasture. In the spring of 1911 all remaining stones were removed, thorough preparation given, and potatoes planted about June 20. At the time of planting 500 pounds of fertilizer per acre were used. The early part of the season was very dry, and growth was relatively slow. In August rains came, the potatoes

FIG. 2.—The 11-acre field of potatoes on the hill farm of M. J. English. Compare with figure 3.

began to grow luxuriantly, and on September 14, the date of the first killing frost, they looked extremely well. (See fig. 2.) The late date of planting, the rather unfavorable weather in the early part of the growing season, and the early killing frost all combined to reduce the yield, but in spite of the untoward conditions about 120 bushels of potatoes per acre were produced. These, selling at $1 per bushel, gave a profitable crop. The next season this land was limed, acid phosphate used, and oats sowed.

A DEFINITE ROTATION FOR UPLANDS.

Mr. English's plan of handling his upland is a 3-year rotation of potatoes, oats, and clover. Clover is used to furnish pasture, organic matter, and nitrogen. Lime is used with seedings of oats to secure

clover stands. This land is deficient in phosphoric acid, and an application of acid phosphate with oats increases the yield of grain and improves the clover. Potatoes are the money crop. The application of the lime and fertilizer to the oats and the growing of clover helps the land for the potatoes. The largest quantity of fertilizer is put directly on the potato crop, but even here the application is not excessive and the crops that are secured warrant the expenditure. It will be noted that nothing has been said about spraying the potatoes. They are not sprayed, because it is practically impossible to get the water necessary for spraying operations up to this land. The potatoes are planted late and the bugs are poisoned. Blight is

FIG. 3.—A sample of the hill land of the English farm where practically nothing but "poverty grass" and five-finger was growing when renovation was begun. The oats on the left yielded 55 bushels per acre. Compare with figure 2.

not common in late plantings on this high land and no attempt is made to combat it.

The yields in this scheme of land improvement may not seem particularly large. It must be borne in mind, however, that the system has been employed but a short time and also that the work is carried on on a type of soil which responds none too readily to treatment and which is generally quite badly depleted. Only by seeing the surrounding fields can one get an idea of the improvement. Generally the crops do not grow very well and clover is almost a complete failure. In many of the surrounding pasture fields the conditions are so poor that the daisies, paintbrush, five-finger, and goldenrod can scarcely live. (See fig. 3.)

The accomplishments in this method of land improvement have been made with no stable manure in the scheme of operation. The improvement of land by the use of stable manure is comparatively easy, but there is not enough for all of the land. Mr. English has shown that stable manure is not absolutely essential for land improvement in southern New York. Green-manure crops, cultivation, rotation, and the judicious use of fertilizers and lime will accomplish the object.

Mr. English says that there are a few essentials for the improvement of hill land. First of all is drainage, natural or artificial. Short rotations are desirable because they permit frequent and thorough cultivation. Lime is essential to get clover. Clover is essential to soil improvement. These lands need organic matter, and no system of improvement will be a success which does not build up the organic content of the soil. Phosphoric acid is important. It increases the yield of all crops and aids materially in securing clover stands. Short rotations help to secure better production, more easily maintain fertility, and keep down weed pests. They furnish a means for practicing frequent and thorough tillage.

MAKING A RUN-DOWN HILL FARM PROFITABLE.

To a farmer with a good business instinct it was evident that the improvement of run-down hill land is very profitable. Much of the land in the neighborhood was available at a very low price, and, as Mr. English was already farming at a profit in the valley, he had the necessary money to invest. As he knew of no investment which, with the upward tendency in the values of eastern lands, would be safer than this or on which he could make a better rate of interest, he was not long in purchasing one of these "worn-out" hill farms.

The farm selected consisted of 95 acres of gently rolling land situated on the top of the second tier of hills above the main valley, at an elevation of 1,350 feet and about 5 miles from the home farm. There is nothing out of the ordinary about this farm; it lies partly on either side of the crest of a ridge, with east and west slopes, about 6 miles from the city of Binghamton. The soil is the characteristic Volusia silt loam of the region and only fairly well drained. When put in proper condition it is an excellent potato soil. The land had been cropped with hay and buckwheat for years, with practically no humus or fertility supplied, and its physical condition was very poor. Minimum cultivation had been given, but there was an excellent frame house and a rather poor barn on the place. The purchase price was $1,550 cash, or $16.32 per acre, which is about the average price of similar land in the region.

MANAGEMENT THE FIRST YEAR.

It was desired not to spend any more money on the farm than was absolutely necessary and to make the farm earn interest on the investment as soon as possible. This fact makes the example all the more practical for the farmer of average means to follow. A tenant was engaged to live in the house and do the work on the place under the owner's direction. He was given one-half of the oats, buckwheat, and potatoes, and was permitted to keep four cows and to have the income from them, provided he fed all the hay and roughage and used all the straw on the farm, returning the manure, straw, etc., to the land. The tenant was also to do all the improvement work for the owner which he had time to do, such as picking up stones and cutting hedgerows. A small apple orchard was reserved. The owner furnished all the lime and clover seed and one-half of the other seeds and fertilizer. The tenant furnished his own teams, most of the machinery, and all the labor. The owner furnished a potato planter and a digger.

Mr. English took actual possession of the farm on April 1, 1910. Owing to the time of starting it was impossible to carry out the definite plans for improvement and only such crops as could be planted conveniently were used the first year. Consequently, the land was not as carefully prepared as it would otherwise have been. The potato seed available was very poor and only 400 pounds of commercial fertilizer were used, thus making a low yield, the 4 acres producing about 90 bushels per acre. About 5 acres of buckwheat were sown, yielding 116 bushels. Lime and acid phosphate were applied to one 8-acre tract. On this tract 300 bushels of oats and an excellent stand of clover were obtained. Ten head of young cattle were pastured on the west slope, where the land was rough and not available for tillage. The old meadow was cut, yielding about 1 ton of poor hay per acre.

Permanent repairs cost practically $400. During the summer the tenant cut the brush and young trees in the hedgerows on the farm and generally cleaned up about the place. The balance on the owner's books showed that his account with the farm at the end of the first year, on April 1, 1911, stood as shown in Table IV.

TABLE IV.—*Expenses of and income from the 95-acre hill farm of Mr. English for the year ended March 31, 1911.*

Investment.	Amount.
95 acres of land, at $16.32 per acre	$1,550
Improvements	400
Total investment	1,950

Expenses.	Cost.	Income.	Gross receipts.	Net receipts.
Taxes	$18.00	150 bushels of oats, at 45 cents	$67.50	
4,000 pounds of lime	14.00	58 bushels of buckwheat, at 60 cents.	34.80	
400 pounds of fertilizer for potatoes	6.80	180 bushels of potatoes, at 60 cents	108.00	
20 bushels of seed potatoes, at 60 cents	12.00	10 head of young cattle pastured 6 months, at $3	30.00	
800 pounds of acid phosphate for oats	4.80			
8 bushels of seed oats, at 60 cents	4.80			
4 bushels of buckwheat, at 60 cents	2.40			
Grass seed for 8 acres	16.00			
Insurance	4.00			
Total	82.80	Total	240.30	
		Owner's income (interest on investment is not deducted)		$157.50

The owner's income amounts to 8.08 per cent on the investment of $1,950. In this calculation no account is taken of the owner's supervision, as the exercise of it did not detract from that of the home farm.

In addition, the farm was very materially improved by deeper plowing, better cultivation of the crops, and by cleaning up around the place.

MANAGEMENT THE SECOND YEAR.

The following year about 9 acres of sod land were plowed 7 or 8 inches deep and thoroughly prepared for potatoes. Unfortunately, the tenant left some of the cut seed potatoes exposed for several days without the owner's knowledge, and these made a very uneven stand when planted. Three plantings were made. The first from freshly cut seed gave a fine stand and yielded 150 bushels to the acre. The next was the largest and made a very poor stand, yielding only 50 bushels to the acre, while the last was good and yielded 150 bushels to the acre. From the whole field 816 bushels were dug, an average of about 90 bushels per acre, a very low yield. These were worth $1 a bushel at the farm, however, which in part made up for the low yield.

In spite of a very dry season the clover sown the previous year came up very well. From a 2-acre plat over 4 tons of fine clover hay were cut, while the remainder of the new seeding cut about 1 ton of good hay per acre. Eight acres of oats in which the usual seeding of clover and timothy with lime and acid phosphate was made yielded

186 bushels of grain. Buckwheat yielded 120 bushels of grain on 5½ acres. On the rough pasture 13 head of young stock were summered.

RENOVATING THE OLD ORCHARD.

On this farm there are about 2 acres of old apple orchard in which some 30 trees are still in fairly good condition (fig. 4). About one-third of these are of the Northern Spy variety, one-third Rhode Island Greenings, some Russets, and the remainder summer and early

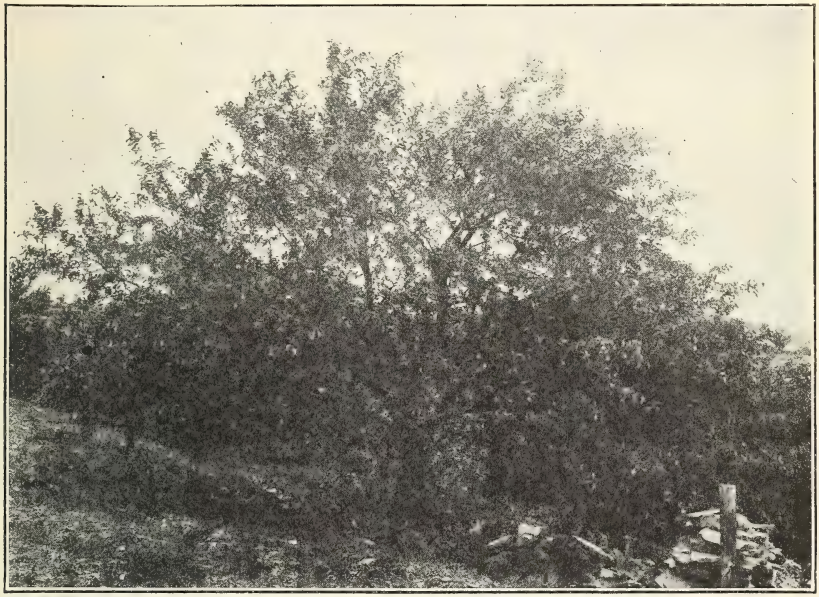

FIG. 4.—One of the Northern Spy apple trees in the small orchard on the hill farm of M. J. English. This orchard of 30 trees was renovated at a cost of $90 and yielded a total income of $360. The owner's net profit as a result of the first year's work was $270.

fall apples. Having become somewhat interested in apple growing and having seen the opportunity to develop a local market trade in this fruit, Mr. English decided that he would try to renovate this old orchard. The previous year he had cut all the underbrush, berry bushes, etc., which had grown up in the orchard. The tenant was paid for all work in the orchard, which was reserved by the owner, who thus had the entire income from it. Two sprayings were made, using a hand pump, the first just before the trees came into bloom and the second just after the blossoms had fallen. Table V shows the cost of renovation and the income derived from the orchard.

TABLE V.—*Cost of and income from renovating an old 30-tree apple orchard on the English farm.*

Renovation.	Cost.	Income.	Gross receipts.	Net receipts.
Pruning and thinning trees	$5	400 bushels from 30 trees:		
Plowing	6	100 bushels of early fall apples, at 50 to 75 cents per bushel	$70	
Harrowing (several times)	6	280 bushels of first-class winter apples, at $1 per bushel	280	
Thomas slag for fertilizer (one-half ton)	8	20 bushels of seconds, at 50 cents per bushel	10	
Labor in applying slag	2			
Spraying (twice):				
Material	3			
Labor	10			
Picking, at 5 cents per bushel, and marketing, at 5 cents per bushel, etc.[1]	50			
Total	90	Total	360	
		Deduct cost of renovation	90	
		Average gross income per tree	12	$270

[1] The total cost stated includes all incidental expenses in connection with picking and marketing.

FIG. 5.—View of the English farm, showing the general topography of the hill land in southern New York and the stony character of much of the Volusia soil. The field in the foreground is the one in which the young apple orchard was set.

The result of one year's work in this old orchard is *at least ten times its income in former years.*

SUMMARY OF THE RESULTS ON THE HILL FARM.

It was necessary to make a number of improvements on the hill farm in 1911. The barn was repaired at a cost of $100. Old fences were torn down to make ready for new ones, and the fence posts and wire purchased. Eighty apple trees were set in a 3-acre field adjoining the old apple orchard at a cost of $35 (trees, $20; labor, etc.,

$15). The varieties set were Baldwin, Northern Spy, Wagener, and Rhode Island Greening, 20 trees of each. The type of soil on which this orchard was set is shown in figure 5. Ten trees each of five varieties of peach were also set, to find out what they would do on the soil at this elevation.

On April 1, 1912, at the end of the second year under the new management, the owner's account with this farm was as shown in Table VI.

TABLE VI.—*Investment, expenses, and income on the 95-acre hill farm of Mr. English for the year ended March 31, 1912.*

Investment.	Amount.
1910 investment	$1,950
Improvements on barn	100
Fencing	50
New apple orchard, care of trees and setting	35
Total investment	2,135

Expenses.	Cost.	Income.	Gross receipts.	Net receipts.
Taxes	$18.00	400 bushels of apples	$360.00	
50 bushels of seed potatoes, at 50 cents	25.00	93 bushels of oats, at 60 cents	55.80	
Commercial fertilizer for potatoes	26.00	60 bushels of buckwheat, at $1.50 per hundredweight	43.20	
6 bushels of seed oats, at 60 cents	3.60	408 bushels of potatoes, at $1	408.00	
Orchard renovation	90.00	13 head of young cattle pastured, at $3	39.00	
2 tons of lime, at $5 per ton	10.00			
Grass seed for 8 acres	18.00			
Insurance	4.00			
900 pounds of acid phosphate for oats	15.40			
4 bushels of buckwheat seed, at 60 cents	2.40			
Total (not including household)	212.40	Total	906.00	
		Owner's income (interest on investment not deducted)		$693.60

Excluding the owner's superintendence and the use of a few tools, this sum represents a return of 32.5 per cent on the investment at the end of the second year. Allowing the owner $500 for his superintendence and $20 for the use of the tools, the investment still yielded an income of 9 per cent.

LABOR PROBLEMS ON THE ENGLISH FARM.

MAN LABOR.

Since a better distribution of labor has been effected, it has been and is now employed by the year. Two men are kept on the 160-acre farm all the year and some extra help is occasionally required. The owner, of course, works with the men when the duties of superintendence permit, and an 18-year-old son works regularly. The men hired by the year are started at $30 per month, with a house, a garden plat, and the milk necessary for their family use. If they

prove satisfactory and show a proper interest in the work, they receive an increase of $1 a month for each year they stay. In addition to this, each man gets a vacation of from one to two weeks with pay, but this leave must, of course, be taken when work is not too pressing. Each workman gets his pay regularly at the end of the month and never between pay days, except in emergency cases.

The men work from 12 to 12½ hours a day. Promptness at both ends of the day are prerequisites, and the owner is insistent that all work, including the chores, shall be finished by 6 p. m. The dairy affords the principal work during the winter, and each man has certain cows to milk each day. The morning hours are 4 o'clock in winter and 5 o'clock in summer, and the cows are milked at exactly 12-hour intervals. By these methods Mr. English has as nearly solved the farm-labor problem as any farmer we have known. He always employs high-class men rather than have men in his employ whose labor is not profitable.

HORSE LABOR.

The horse labor on this farm is done by big draft horses. Mr. English believes in high-class animals, just as he does in high-class men. If horses cost more, he makes them earn more by keeping them well occupied on productive enterprises. The work is so arranged that the horses are idle only a small portion of the year in the winter. They are fed cheaply on oat hay or straw and with ground oats (at a usual cost of $23 a ton) or the mixture shown in Table VII (1910 prices).

TABLE VII.—*Horse-feed constituents and cost of feeding on the English farm.*

Quantity and cost of feed constituents.				Quantity fed and cost of feeding.			
Feed constituent.	Pounds.	Rate per ton.	Cost.	Season.	Quantity per feed.	Quantity fed per day.	Cost per feed.
						Quarts.	*Cents.*
Linseed meal	100	$35	$1.75	Winter	3 quarts, or 3 pounds.	9	11
Corn meal	100	20	1.00	Spring	4 quarts, or 4 pounds.	12	15
Bran	100	23	1.15	Summer	4 or 5 quarts, or 4 or 5 pounds.	12–15	15–19
Ground barley	200	25	2.50				
Total feed	500		[1] 6.40				

[1] About 1¼ cents per pound.

No timothy and no clover hay have been fed to the horses on this farm for five years, it having been found that the animals do as well or better on oat hay or straw, which is a cheaper feed.

MARKETING.

A large part of the success of Mr. English is due to his ability in buying his materials and in selling his crops. He thoroughly understands marketing. Many of his sales are made directly to the consumer; but if it can be done advantageously, he sells in large quantities to dealers. Mr. English is very particular as to the quality of his products. He has built up such a reputation that everyone is anxious to buy his products, and often he would be able to sell more than he produces. At present the potato and apple crops are sold directly to the consumer. Milk and other crops are sold to dealers. In his reputation for quality and strict honesty he possesses an asset which has contributed in no small way to his success.

HOME LIFE.

The family consists of a wife, who is as interested as her husband in the success of the farm and whose advice is eagerly sought in the conduct of the enterprise, a son who has attended high school in the city near by, and two younger children, a boy and a girl, who attend near-by city schools. The house has been remodeled since Mr. English purchased the farm. A water system which receives its supply from a spring on the side hill supplies water to the barn and house. The dwelling, with its modern plumbing and heating systems, is convenient and cheerful.

SUMMARY.

Success on this farm is due to wise management and proper adjustment of all phases of farm business—capital, labor, crops, animals, and marketing—in their economic relationships. This farmer secured all the aid he could from educational institutions, studied his farming as any good business man would study his business, and successfully solved his problems one by one.

The dairy has been the largest source of income from the first. Poor and unprofitable cows have been eliminated. Every cow that could not show a profit has been sent to the shambles.

The labor necessary to run the dairy has been fully and profitably utilized by growing cash crops on the farm in addition to those needed for the dairy. This has reduced the cost of milk production.

Diversification has been an important factor in the successful management of this farm. A rotation was built up with this threefold purpose in mind: (1) To maintain fertility and improve soil conditions, (2) to produce as much of the necessary animal rations as possible, and (3) to provide profitable cash crops. In this case a rotation on the river bottom land, with barley as the small grain and clover for hay, followed by corn for silage or potatoes for sale, best answered these purposes.

A 6-acre field typical of the uplands and of the neglected and run-down farms of the region, worth less than $20 an acre, has been systematically improved and made worth not less than $100 an acre at an expense of less than $30 an acre.

Improvement was accomplished by deep plowing and thorough cultivation of the soil, by liming the land, and by plowing under successive crops of rye, buckwheat, and clover to supply the needed humus.

Experience with a second field indicates that profitable crops can be obtained by deep plowing and good cultivation, supplemented by the rational use of commercial fertilizers, without the initial expense in time and money of growing and turning under green crops. Improvement of land can be accomplished without the use of stable manure, provided the proper system is used.

From 20 to 200 bushels of potatoes per acre have been obtained on these hill soils by these methods, as well as 55 bushels of oats per acre and good stands of clover. A rotation of oats, clover, and potatoes is recommended for these cheap hill lands where they are properly drained. Drainage is important.

The distribution and proper utilization of the labor of both men and horses is a noteworthy feature of this farm. A definite system is followed, the men being systematically promoted, paid in cash each month, given a vacation with pay, and working a definite number of hours each day.

Success with badly depleted fields suggested a larger opportunity for the purchase and proper management of other run-down farms. One was purchased at $16.32 an acre, and under a tenant system was made to pay 8 per cent on the investment the first year and 32.5 per cent the second year.

The renovation of an old apple orchard of 30 trees was made an important supplementary source of income.

The owner of a valley farm is in a position to handle contiguous hill lands in connection with his home farm more profitably than anyone else because of the smaller expense in labor and equipment and because the income per acre on cheap land is usually too low to support a family and an expensive equipment.

Skillful marketing and close attention to the wants of a local market have been important factors in the success of Mr. English. This success is due to the application of sound business methods and principles.

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